DOCUMENT RESUME

ED 255 212 IR 051 055

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TITLE The Invisible User: A User Needs Assessment for Library Public Services.
SPONS AGENCY General Electric Foundation, Ossining, N.Y.
PUB DATE [Jun 84]
NOTE 18p.; Paper presented at the Meeting of the Association of College and Research Libraries, Science and Technology Section (Dallas, TX, June 23, 1984). For related document, see IR 051 074.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Libraries; Computers; Higher Education; *Information Needs; Information Retrieval; Input Output Devices; Library Planning; Library Services; *Needs Assessment; *Online Systems; Technology Transfer; *User Satisfaction (Information); Use Studies
IDENTIFIERS Online Catalogs; *University of Illinois Urbana Champaign

ABSTRACT

Recognizing that the proliferation of personal computers and microcomputers has made it possible for individuals to access information and library resources electronically, a user study was undertaken by an academic library to determine if these "invisible" individuals accessed information differently than more traditional library users. A needs assessment survey questionnaire was both mailed to a stratified random sample of 1,200 teaching faculty (to ensure a representative distribution from the sciences, the humanities, and the social sciences) and also mounted on the University of Illinois' PLATO system and the campus' primary mainframe, the CYBER 175. Paper questionnaires were returned by 615 individuals. The online questionnaire was completed by 71 CYBER and 37 PLATO users out of a population of unknown size. Responses from both the printed and online questionnaires were coded and analyzed using the SPSS software. The subject of this paper is an initial, and primarily descriptive, examination of the data. The data are evaluated by method of response (mail or computer) and by broad subject discipline (humanities, sciences, and social sciences). Four tables accompany the report. (THC)

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ED255212

THE INVISIBLE USER:

A USER NEEDS ASSESSMENT FOR LIBRARY PUBLIC SERVICES

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ABSTRACT

With the computer revolution, it has become possible for individuals to access information and library resources electronically rather than through conventional means. A user study, employing both a mail questionnaire and a computer mounted questionnaire, was undertaken at the University of Illinois at Urbana-Champaign to determine if these "invisible" individuals accessed information differently than more traditional users of the library. In addition, respondents were queried as to what they saw as needs for improved services for information access. The data were evaluated by method of response (mail or computer) and by broad subject discipline (humanities, sciences, and social sciences).

THE INVISIBLE USER: A USER NEEDS ASSESMENT FOR PUBLIC SERVICES *

There can be little argument that computers are changing the nature of library service. What may be less clear is that the evolving character of automation itself appears to be bringing about further significant changes in the ways people use libraries. Specifically, the advent of the relatively inexpensive, but powerful microcomputer now allows a radically decentralized access to library databases. This growing democracy raises important issues for librarians.

At the University of Illinois, the question we have begun to explore is the degree to which librarians can develop and provide both appropriate and effective library services in this new decentralized context. What has concerned us most was the realization that so much of our perception of patron needs and, consequently the kinds of services which we were providing, was based on our interaction with patrons. Even where large mainframe systems, have been used in libraries, such as our LCS automated circulation system, the majority of patrons were required to come into the library to use the terminals. Helping users locate items in the automated systems and instructing them in the use of that system as well as the ongoing and more traditional interactions of reference and circulation helped librarians keep in touch with patrons' needs and problems. As micros have become more and more common in both the office and home, however, and demand for end-user searching capability and more dial-up ports to our LCS database has continued to grow, we began to get the uneasy feeling that the library might be losing touch -- or perhaps had never gotten in touch -- with an important and perhaps sizeable user group. For example, a patron with a home or office microcomputer at the University of Illinois can dial into the LCS database, search the library's holdings and remotely request a book be delivered to an office or dorm.

Although the library had already offered remote access via the telephone, the library's phone center staff did the database searching of LCS. Now, no staff interaction is necessary when a computer terminal is available in the home or office of the library user. We were also aware that vendors of bibliographic search services were increasingly focusing their appeal to the home market. Consequently, we began to wonder if there might be a growing population of library patrons who are active library and information users but who seldom or never interact with a

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* From a presentation given at the Association of College and Research Libraries, Science and Technology Section. Dallas, June 23, 1984. The research was funded in part by the General Electric Foundation and administered by the Office of Management Studies, Association of Research Libraries.

librarian or even come into the library. These individuals who access information and library resources electronically rather than by conventional means became the target of a study to determine who these people are, how numerous are they, and what are their information gathering habits. We called this group "the invisible users."

The basis of this exploration was a study, funded by the Office of Management Studies of the Association of Research Libraries, and undertaken in the spring of 1984 at the University of Illinois at Urbana-Champaign by the members of the Departmental Library Services Director's Council. The purpose of the study was twofold. First, we sought to find out more about this group of possible "invisible users," their use patterns and information needs and how they might differ from more traditional users. Second, our methodological design was to explore the use of an online mechanism for survey purposes with a possible follow-up and refinement of the survey data through teleconferencing.

The vehicle for the study was a needs assessment survey questionnaire developed with the assistance of the University's Survey Research Laboratory (see Appendix). After pre-testing, the questionnaire was both mailed to a stratified random sample of 1,200 teaching faculty (to ensure a representative distribution from the sciences, the humanities, and the social sciences) and also mounted on the University of Illinois' PLATO system and the campus' primary mainframe, the CYBER 175, to which faculty and students have easy access, using either available software packages or their own programs. Six hundred and fifteen usable paper questionnaires were returned plus those from four individuals who reported that they had already responded electronically. The online questionnaire was completed by 71 CYBER and 37 PLATO users out of a population of unknown size. The low response rate to the online questionnaires may be in part explained by the inability of the system to notify users as they signed on that the library's questionnaire was available. Only those who checked an online bulletin board were aware of its existence.

The responses from both the printed and online questionnaires were coded and analyzed using the SPSS software. It is this initial and primarily descriptive examination of the data, which is the subject of this paper.

The preliminary findings indicate that there are few demographic variations regarding access to computer facilities at the University of Illinois at Urbana-Champaign. Seventy-eight percent of those responding have access to a terminal; 65% have access to a micro; and 56% report having a modem. Yet as we expected, almost twice as many scientists report access to a mainframe as do those from the humanities, and while the gap between these two groups is not as great for access to a micro, there is variation. The location of hardware is generally evenly

distributed across all categories of users, regardless of discipline or method of answering the questionnaire with most individuals having access through their department.

However, differences do appear in respect to the use of that hardware. Despite the influx of microcomputers and the long lines at computer stores, on our campus there is greater access to and heavier use of a mainframe for all activities except for word processing; almost twice as many people indicate using a micro for that task. Personal management and games are also exceptions. Those who responded electronically on our CYBER system also prefer the mainframe except for doing personal management and creative work. Yet, when the overall response was broken down by discipline, we see an anomaly among social scientists, who tend to use both micros and mainframes fairly equally with a slight preference for the micro.

Word processing ranks as the most frequent activity for all micro users, a finding consistent with the TALMIS survey of faculty use of microcomputers reported in The Chronicle of Higher Education, March 30, 1983. However, the CYBER respondents use micros for word processing to a lesser extent. Otherwise, the same tasks generally appear as the top five activities on both micros and mainframes: namely, personal research, word processing, programming, data analysis, and instruction. Using a computer for instruction is not reported as often by CYBER respondents as by the overall group though. The CYBER people also report slightly less use of either a micro or a mainframe for word processing. Scientists prefer to do word processing on a micro, while social scientists are more involved in accessing machine readable data files, especially on a mainframe, than are the other categories of respondents. Otherwise, the patterns of use are fairly consistent.

However, when the percentage of actual use was calculated, the CYBER respondents clearly are shown to be heavier users of computer facilities. When the figures are broken down by activity, 91% of CYBER respondents spend time on personal research using a micro as opposed to only 41% for the entire population of micro users. Within the disciplines, scientists are the heaviest users of computers. That pattern is evenly consistent but draws closer with word processing, where CYBER users report 67% use as opposed to 57% use for all micro users, although social scientists are the heaviest users of word processing when we examined usage by discipline. Even though there is widespread availability of computer access on campus, those who used the machine to respond to our survey constitute a group who are, indeed, much heavier computer users for both mainframe and micro activities.

Generally speaking, at least 50% of the respondents spend under two hours a week performing the various tasks on a micro, whereas the spread of hours is a little broader on a mainframe. The exception is word processing where 50% of the users spend four hours doing word processing on a mainframe as opposed to between

four and five hours on a micro.

The questionnaire next asked how respondents presently access information. Tables 1 and 2 summarize the responses. Generally speaking, the five most frequently used means of accessing information are the same regardless of discipline: consulting one's own books and journals, consulting the card catalog, consulting a colleague, using bibliographies or references in books and journals, and searching indexes and abstracts, with one's personal library consistently being the most valued. Consulting a library staff member ranks below this short list. These findings are consistent with other user studies. The humanists depart from the pattern by indicating that they browse and use library reference tools more often than their fellow faculty do. They also place less importance on consulting a colleague and on searching indexes and abstracts. Scientists tend to use traditional means of library access, such as browsing the book shelves and consulting library reference materials and the card catalog less frequently than do people in the other disciplines. In contrast, these same activities are highly used by the humanists, who also do proportionately more searching of LCS outside the library than do the other respondents. The latter may be explained in part by the University of Illinois at Urbana-Champaign Library's desire to offset the humanists' possible lack of LCS access available to other disciplines by installing LCS terminals in two buildings which house many of the humanities faculty.

TABLES 1 and 2

When we examined the responses in terms of how the faculty answered (Table 2) we discovered that our heaviest users of computer facilities, those who responded on CYBER, tend not to have a commonality with the other respondents. While the CYBER group also prize their personal libraries and avail themselves of many traditional library services, they are more frequent users of LCS rather than the card catalog. Although searching commercial databases themselves does not rate highly, these CYBER respondents indicate more use in the library of online databases than do any other group. The CYBER respondents consult a colleague or a librarian less frequently than does the rest of the sample population. CYBER users seem to locate information through automated systems while the others in the sample are more frequent users of more traditional means of access.

In addition to finding out how people access information, we also asked them to indicate the importance of each method of access. Again, respondents in all disciplines and those answering on CYBER all indicate their own materials to be very important. Very few express interest in online searching outside the library.

After this point, there is considerable variation in the means of access considered to be important by each group. However, some findings do stand out. When the number of responses regarding the use of the card catalog was examined, the CYBER respondents are not as enamoured of this means of access to information as is the overall group, reinforcing our observations about the information-seeking practices of library users who also use computers. In addition, almost as many CYBER respondents feel using LCS in the library is as important as consulting their own materials in gaining access to information. Other respondents value references found in books or using the card catalog as much as they do consulting their own materials. Again, humanists seem to have a different set of attitudes toward meeting their information needs. Consulting a colleague, browsing the book shelves, and using indexes are all as important to humanists as using LCS in the library, consulting library staff, using reference books, or online searching in the library are to scientists. CYBER respondents indicate the same level of importance for using the card catalog, consulting a colleague, and using reference books. When Cyber respondents were compared with the whole group, LCS use inside and outside the library is regarded very highly by relatively more CYBER respondents than others, regardless of discipline. Consulting a colleague and using the card catalog are less valued by CYBER respondents than by the general population, regardless of discipline.

Another set of questions asked respondents what improvements in library service would be most important to them. Tables 3 and 4 summarize these responses. Here patterns among the disciplines are not apparent. There is considerable interest in more dialup capability to access the library's online systems, training for users to search online commercial databases themselves, and 24 hour online reference service. While obtaining information with the aid of a library staff member is only of moderate concern, there is substantial interest in using a machine to reach that staff. Respondents want more LCS terminals available in dispersed locations on campus and more online bibliographic databases available in the library. Analysis by discipline of the request for LCS terminals and more training to use LCS illustrates that many users in the social sciences and the humanities are just begining to familiarize themselves with the library's automated systems. Humanists' preference for more printers available for LCS may indicate their preference for paper. Of note is the fact that there seems to be little interest in lending terminals for home or office use or in the library's providing other online services, such as The Source, CompuServ, or machine readable databases.

TABLES 3 and 4

Table 4 illustrates that CYBER respondents again constitute a unique group. They share an interest with others in having more LCS terminals available throughout the campus and more dialup access, but they are far more interested in using computers to facilitate their more independent and decentralized quest for information. In addition, online 24 hour reference service and the ability to request interlibrary loan materials and put items on reserve electronically appeal to these users. Next in importance is interest in the library's offering more commercial bibliographic databases and providing training so they can search the databases themselves. While the analysis of our data is still too preliminary to propose a new paradigm for public services, we believe that these findings do raise certain important questions concerning possible future directions that public services might take because of the impact of electronic systems upon library users.

Currently, the environment within libraries is one of traditional manual operations being selectively enhanced by automated systems to provide user services as well as performing traditional day-to-day processing activities. With few exceptions, the computer-based systems in libraries have been designed to convert existing library files, e.g., the card catalog and circulation records, into machine readable form. These exercises in rudimentary automation have been designed primarily within a management, rather than a user, framework. If the user has been considered it has usually been within the context of minimally enhancing existing systems rather than developing new ones. That these systems actually represent a traditional library paradigm is quickly ascertained by the lack of flexibility or expandibility of these applications of automation.

It is difficult in such an environment to determine if the methods by which people access information are changing. The respondents to the mail questionnaire are individuals who, in fact, do live in a very active, mixed manual and automated library environment. Yet, they value the methods by which they access information in virtually the same ways shown by every other study in the last 30 years. Where variations occurred within the sample, these differences were readily explained by the normal discrepancies that exist between the manner in which scientists, social scientists, and humanists access information. However, by mounting the questionnaire on the University's mainframe CYBER, we discovered a population that responded in some ways differently to the questions of information access from both our own and previous studies of traditional library users. CYBER users are more inclined to use LCS, the library's enhanced online circulation system, for searching rather than using the card catalog. Especially noteworthy is that a user of CYBER is more likely to search online databases outside the Library and twice as likely to access LCS from a terminal outside the Library as a non-CYBER user. They are less inclined to consult librarians than the non-CYBER user. Corroboration of this decentralized information model is evidenced by their responses to the improved

services section of our questionnaire. These CYBER users' preference for dialup access to LCS, 24 hour online reference service, and more online databases, is twice as favorable as their colleagues who responded by mail questionnaires. Here then was our "invisible user."

If these users exist with a different model for accessing information and different expectations of what services should be in the future, how are we in libraries going to serve them? While not necessarily siding with the pundits of a paperless society, we would like to make a few suggestions for a model of service for the growing number of individuals who are able to access information electronically. None of the following, however, denies or precludes the need for traditional library service as it now exists.

If the information needs of this new clientele, the "invisible user," are to be served, it is essential that the concept of centralized user services be carefully scrutinized. For the type of user identified as actively involved in computer-based systems, it is highly questionable that a centralized library without any decentralization is going to serve that individual effectively. We may seriously question if requiring these users to leave their offices or homes for library services is a valid way in which to serve them. Is a new decentralized model not after all at the heart of the "electronic cottage"?

What then can public services librarians do to improve services to the "invisible user"? Automated circulation systems and online catalogs must have the capability to extend outside the walls of the library, and these systems must be able to expand to accommodate access by the individual user, either by telephone dialup or another type of network connection. It is dubious to refer to a system as "user-friendly" if it provides access only within the confines of a single building for a limited number of hours each week. Many of the current systems strongly reflect management needs rather than user needs. Even within a system like LCS which allows usage outside the confines of the library, we see a continual flow of requests for more dialup ports.

Beyond assuring that current library technology will be available to the user who can access systems electronically, libraries need to link to computer-based communication networks. Within the framework of academia, there is a growing concern by universities and units therein, such as Colleges of Engineering, to develop these computer networks. Such networks which link computers to each other provide an excellent opportunity for libraries to participate in systems which are actively used by "invisible users." Library automated circulation systems and online catalogs should be able to interface with these systems. More importantly, such a unified system should include an electronic mail capability which will allow librarians an effective and appropriate avenue of communication with "invisible users."

Our questionnaire alluded to two possible applications for using an electronic mail system. First was the ability for faculty to place materials on reserve for courses via the computer. Using the electronic mail capability, the faculty member could call up a standardized form that s/he would fill out on the computer. Each reserve request item would automatically interface with the online circulation system to determine if the item was owned and available. If available, it would be paged for reserve and the request incorporated into an automated reserve system with an electronically produced status report routinely generated to the requestor.

An online 24-hour reference system could be made up of two components -- one, a reference database constructed to provide answers and sources for the most commonly requested questions of the particular clientele. Two, a mailbox in which the "invisible user" could leave messages and reference queries that would be responded to at a later time when the librarian checked his or her mailbox. This approach has particular appeal in a world in which reference librarians have irregular hours and/or at least some of the patrons work at hours when the library is not open.

These two examples give only two possible ways in which the "invisible user" might be served. Such scenarios, if they are brought to fruition, would reinforce the "invisible users'" chosen isolation from the physical library but would not isolate them from the librarian. It is important to understand that the "invisible user" is very concerned with information access and is desirous to have the librarian be a part of that process. However, if librarians choose to ignore this group of users, they in contrast to previous disaffiliated patrons, have the potential to build information systems of their own and access systems without using the librarian as an intermediary. It, therefore, behooves us at least to incorporate this group of users into any model of service which we might develop. For it is certain, that the "invisible user," like the computer, is going to be with us for a long time.

Table 1

Present Means Of Accessing Information:
Ranked By Number Of Responses Tabulated By Discipline

	Science			Humanities			Social Sciences			Combined		
	rank	N	%	rank	N	%	rank	N	%	rank	N	%
Consult own books	1	264	94.0	1	163	92.6	1	241	92.3	1	669	92.5
Consult colleague	2	243	86.5	6	135	76.7	4	222	85.0	4	601	83.1
Consult card catalog	3	241	85.8	2	161	91.5	2	234	89.6	2	638	88.2
Use bibliographies or references in books	4	234	83.3	3	157	89.2	3	229	87.7	3	622	86.0
Search indexes & abstracts	5	215	76.5	8	124	70.4	5	203	77.8	5	543	75.1
Consult library staff	6	196	69.8	7	127	72.2	7	192	73.6	7	516	71.4
Browse stacks	7	178	63.3	5	141	80.1	9	187	71.6	8	507	70.1
Use library reference tools	7	178	63.3	4	143	81.2	6	198	75.9	6	520	71.9
Search LCS in library	9	164	58.4	9	118	67.0	8	190	72.8	9	475	65.7
Search online bibliographic databases in library	10	101	35.9	11	35	19.9	11	83	31.8	11	221	30.6
Search LCS outside library	11	80	28.5	10	69	39.2	10	95	36.4	10	246	34.0
Search online databases outside library	12	46	16.4	12	16	9.1	12	39	14.9	12	103	14.2

N = the number of 'yes' responses to each specific question
The percentage is the expression of the number of 'yes' responses

Table 2

Present Means Of Accessing Information:
Ranked By Number Of Responses Tabulated By Method Of Response

	Paper & Plato Responses			Cyber Responses		
	rank	N	%	rank	N	%
Consult own books	1	605	92.8	1	64	90.1
Consult card catalog	2	589	90.3	5	49	69.0
Use bibliographies or references in books	3	565	86.6	4	57	80.3
Consult colleague	4	554	84.9	7	47	66.2
Search indexes & abstracts	5	484	74.2	3	59	83.1
Consult library staff	6	480	73.6	10	36	50.7
Use library reference tools	7	472	72.4	6	48	67.6
Browse stacks	8	461	70.7	8	46	64.8
Search LCS in library	9	414	63.5	2	61	85.9
Search LCS outside library	10	203	31.1	9	43	60.6
Search online bibliographic databases in library	11	200	30.7	11	21	29.6
Search online databases outside library	12	87	13.3	12	16	22.5

N = the number of 'yes' responses to each specific question
The percentage is the expression of the number of 'yes' responses

Table 3

Enhancements Marked Very Important For Improved Library Service:
Ranked By Number Of Responses Tabulated By Discipline

	Science			Humanities			Social Sciences			Combined		
	rank	N	%	rank	N	%	rank	N	%	rank	N	%
More dialup to library systems	1	105	37.4	2	57	32.4	2	111	42.5	1	278	38.4
Training to do one's own online database searching	2	87	31.0	6	43	24.4	3	96	36.8	4	230	31.8
24 hr online reference service	3	83	29.5	5	44	25.0	9	59	22.6	5	190	26.3
Online interlibrary loan requesting	4	73	26.0	11	33	18.8	10	54	20.7	8	164	22.7
More online bibliographic databases	5	72	25.6	9	39	22.2	7	72	27.6	6	187	25.9
More LCS terminals in dispersed locations	5	72	25.6	1	70	39.8	1	126	48.3	2	272	37.6
Improved LCS training	7	67	23.8	2	57	32.4	4	84	32.2	3	213	29.5
Ability to put items on reserve electronically	8	53	18.9	6	43	24.4	5	78	29.9	7	178	24.6
More printers available for LCS	9	50	17.8	4	46	26.1	8	65	24.9	8	164	22.7
More LCS terminals in central locations	10	35	12.4	8	41	23.3	6	75	28.7	10	154	21.3
Online services such as The Source available in library	11	33	11.7	12	18	10.2	12	53	20.3	12	108	14.9
Terminals for loan	12	32	11.4	10	35	19.9	10	54	20.7	11	125	17.3
Higher baud rate for LCS terminals	13	27	9.6	13	15	8.5	13	44	16.8	13	90	12.4
More machine readable databases available in library	14	22	7.8	14	8	4.5	13	44	16.8	14	78	10.8

N = the number of responses marked 'very important' for each specific item
The percentage is the expression of the number of those responses

Table 4

Enhancements Marked Very Important For Improved Library Service:
Ranked By Number Of Responses Tabulated By Method Of Response

	Paper & Plato Responses			Cyber Responses		
	rank	N	%	rank	N	%
More LCS terminals in dispersed locations	1	241	37.0	3	31	43.7
More dialup to library systems	2	229	35.1	1	49	69.0
Training to do one's own online database searching	3	206	31.6	8	24	33.8
Improved LCS training	4	185	28.4	5	28	39.4
24 hr online reference service	5	158	24.2	2	32	45.1
More online bibliographic databases	6	157	24.1	4	30	42.2
Ability to put items on reserve electronically	7	153	23.5	7	25	35.2
More printers available for LCS	8	146	22.4	11	18	25.4
Online interlibrary loan requesting	9	138	21.2	6	26	36.6
More LCS terminals in central locations	10	131	20.0	9	23	32.4
Terminals for loan	11	112	17.2	14	13	18.3
Online services such as The Source available in library	12	93	14.3	12	15	21.1
Higher baud rate for LCS terminals	13	71	10.9	10	19	26.8
More machine readable data-bases available in library	14	63	9.7	12	15	21.1

N = the number of responses marked 'very important' for each specific item
The percentage is the expression of the number of those responses